REMARKS

Reconsideration of the application is requested in view of the remarks below. In reviewing the "Form PTO 1449" received in the Office Action dated February 28, 2002, Applicants noticed that the Examiner did not initialize the Abstract for DE 198 31 280. Applicants hereby submit a copy of the form and request that the Examiner initialize the form. For the sake of a thorough examination, Applicants hereby submit a copy of WO 00/15555.

A. Abstract

Applicants hereby enclose a new Abstract per Office Action.

B. Rejections Under 35 USC 102

1. The Office Action rejected Claims 1 and 8 under 35 USC 102 over U.S. Pat. No.6,322,912 (Fife). The rejection should be withdrawn in view of the remarks below.

It is well settled that in order for a prior art reference to anticipate claim, the reference must disclose each and every element of claim with sufficient clarity to prove its existence in prior art. The disclosure requirement under 35 USC 102 presupposes knowledge of one skilled in the art, but such presumed knowledge does not grant a license to read into prior art reference teachings that are not there. See *Motorola Inc. v. Interdigital Technology Corp.* 43 USPQ2d 1481 (1997 CAFC).

Applicants' invention encompassed by Claim 1 relates to an anode comprising (a) a niobium metal core, (b) a conducting niobium suboxide layer, and (c) a dielectric barrier layer comprising niobium pentoxide. In one embodiment, Applicants' invention as encompassed by Claim 8 relates to a capacitor having an anode comprising (a) a niobium metal core, (b) a conducting niobium suboxide layer and (c) a dielectric barrier layer of niobium pentoxide.

Fife discloses a method to at least partially reduce a metal oxide selected from a valve metal oxide. The method includes the steps of heat treating the metal oxide in the presence of a getter material like a tantalum and/or niobium getter material or other getter material capable of reducing the metal oxide, in an atmosphere which permits the transfer of oxygen atoms from the metal oxide to the

getter material, for sufficient time and temperature to form an oxygen reduced valve metal oxide (See Abstract). In one embodiment, Fife discloses oxygen reduced valve metal oxides. In another embodiment, Fife discloses methods to increase capacitance and reduce DC leakage in capacitors made from valve metal oxides (See Abstract).

Fife does not disclose Applicants' invention. Fife does not disclose an anode comprising a niobium metal core as asserted by the Office Action. The Office Action refers to column 1, lines 35-44. This passage does not disclose Applicants' invention. Fife discloses typical reduced valve metal oxides are mentioned in column 4, lines 52-54 which comprise suboxides only. According to Fife (column 8, lines 38-47) a pellet of niobium pentoxide is converted into a porous slug of NbO suboxide (line 42) which is further used to produce an anode, i.e., an anode or a capacitor disclosed by Fife comprises a niobium suboxide core and not a niobium metal core as claimed. Such teachings lack the details to place Applicants's invention in the possession of the public as required by 35 USC 102. Reconsideration is requested.

Fife's methods do not disclose an anode comprising (a) a niobium metal core, (b) a conducting niobium suboxide layer, and (c) a dielectric barrier layer comprising niobium pentoxide. Fife's methods do not disclose a capacitor having an anode comprising (a) a niobium metal core, (b) a conducting niobium suboxide layer and (c) a dielectric barrier layer of niobium pentoxide. Reconsideration is requested.

2. Rejection of Claim 4 Under 35 USC 102 over U.S. Pat. No. 6,215,652

The Office Action rejected Claim 4 under U.S. Pat. No. 6,215,652 (Yoshida). The rejection should be withdrawn in view of the remarks below.

Applicants' invention as encompassed by Claim 4 relates to a process for producing an anode for a capacitor comprising sintering niobium metal powders and electrolytically producing a dielectric barrier layer on a surface of a sintered body, in which the barrier layer is produced with an electrolyte that contains an aqueous solution of an organic acid containing an anion.

Yoshida does not anticipate Applicants' invention. Yoshida discloses a solid electrolytic capacitor in which a dielectric layer formed on the surface of an anode is obtained by molding and then sintering a niobium metal powder. The layer includes

a niobium oxide layer and a niobium nitride region (See Summary of Invention). Yoshida also discloses a method for manufacturing a solid electrolytic capacitor by molding and sintering a niobium metal powder to form an anode, and then subjecting the surface of this anode to a nitriding treatment, and a step of anodizing the nitrided anode to form a dielectric layer comprising a niobium oxide layer and a niobium nitride region.

Yoshida's capacitor or method for making the capacitor does not disclose Applicants' invention. The Office Action alleged that it is inherent that the electrolytic capacitor comprises an aqueous solution of organic acid containing an anion.

Applicants' submit that such a statement is not justified. Yoshida discloses that anodization is conducted in an electrolyte (column 4, lines 30-32) without any specification of the kind of electrolyte used. Usually dilute phosphoric acid (see, for example, WO 00/12783 (copy enclosed), page 1, lines 17-19; US 6,115,235, paragraph 5, line 29; US 6,051,044, paragraph 8, line 54 etc.) is used as an electrolyte. According to Applicant's investigations (SEM photographs), no conductive suboxide layer is formed when using this electrolyte. Yoshida simply does not disclose an electrolyte that contains an anion of an organic acid. Yoshida lacks the details that disclose each and every element of the invention encompassed by Claim 4 with sufficient clarity to prove Applicants' invention existed in the prior art. It is well settled that if a chemical compound is inherently disclosed in a reference, the USPTO must provide factual and technical grounds for establishing that the claimed invention inherently flows from the teachings of the prior art (*Ex parte Levy* 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Int 1990)). The Office Action does not provide factual and technical grounds for establishing that Applicants' invention inherently flows from the teachings of Yoshida. Reconsideration is requested.

C. Rejections Under 35 USC 103

1. Rejection of Claim 2 Under 35 USC 103 Over Fife in view of U.S. Pat. No. 6,136,062

The Office Action rejected Claim 2 Under 35 USC 103 over Fife in view of U.S. Pat. No. 6,136,062 (Löffelholz). The rejection should be withdrawn in view of the remarks below.

It is well established that to establish a *prima facie* case of obviousness, the USPTO must satisfy all of the following requirements. First, the prior art relied upon, coupled with the knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or to combine references. *In re Fine*, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Second, the proposed modification must have had a reasonable expectation of success, as determined from the vantage point of one of ordinary skill in the art at the time the invention was made. *Amgen v. Chugai Pharmaceutical Co.* 18 USPQ 2d 1016, 1023 (Fed Cir, 1991), *cert. denied* 502 U.S. 856 (1991). Third, the prior art reference or combination of references must teach or suggest all of the limitations of the claims. *In re Wilson*, 165 USPQ 494, 496, (CCPA 1970).

Applicants' invention as encompassed by Claim 2 relates to an anode comprising (a) a niobium metal core, (b) a conducting niobium suboxide layer, and (c) a dielectric barrier layer comprising niobium pentoxide, in which the anode has a tantalum content in the dielectric barrier layer ranging from about 1500 to about 12,000 ppm, relative to the anode.

Fife teaches a method to at least partially reduce a metal oxide selected from a valve metal oxide. The method includes the steps of heat treating the metal oxide in the presence of a getter material like a tantalum and/or niobium getter material or other getter material capable of reducing the metal oxide, in an atmosphere which permits the transfer of oxygen atoms from the metal oxide to the getter material, for a sufficient time and temperature to form an oxygen reduced valve metal oxide (See Abstract). In one embodiment, Fife teaches oxygen reduced valve metal oxides. In another embodiment, Fife teaches methods to increase capacitance and reduce DC leakage in capacitors made from valve metal oxides (See Abstract).

One of ordinary skill in the art following Fife, singly or in combination with Löffelholz, would not have been motivated to modify Fife and make Applicants' invention.

Fife does not teach an anode comprising a niobium metal core as required by by Claim 3. Fife does not teach the presence of a **suboxide layer** of a certain thickness. Anodes according to Fife comprise a niobium suboxide core which is not a layer as defined in Applicant's claims. Fife's method to at least partially reduce a metal oxide selected from a valve metal oxide simply would not have motivated one of ordinary skill in the art to modify Fife, singly or in combination with Löffelholz and make Applicants' invention. In other words, Fife lacks the teachings required by 35 USC 103 to suggest Applicants' invention. Reconsideration is requested.

Löffelholz does not overcome the deficiencies of Fife. Löffelholz does not suggest Applicants' invention. One of ordinary skill in the art following the teachings of Fife, singly or in combination with Löffelholz would not have been motivated to modify Fife, make or practice Applicants' invention.

Löffelholz teaches a process for producing niobium and/or tantalum powders by reducing the corresponding niobium and/or tantalum oxides by means of alkaline earth metals and/or rare earth metals, which is characterized in that the reduction is carried out in two stages at a controlled temperature, in which the first reaction stage is conducted as far as an average composition corresponding to (Nb, Ta)O_x, where x=0.5 to 1.5 and before the second stage the reduction product from the first stage is freed from alkaline earth oxides and/or rare earth metal oxides which are formed and optionally from excess alkaline earth metal and/or rare earth metal by washing by means of mineral acids (See Summary of Invention).

Löffelholz does not teach a capacitor anode based on niobium and having a specific content of tantalum in the dielectric barrier previously described. One of ordinary skill in the art following Löffelholz would not have been motivated to modify Löffelholz and make Applicants' invention.

Löffelholz does not contain any teachings that would have motivated one of ordinary skll in the art following the teachings of Fife to modify Fife and make or practice Applicant's invention. Applicants request that the U.S. P.T.O acknowledge

the differences that exist between Applicants' invention and the inventions taught by Fife and Löffelholz and withdraw the rejection. Reconsideration is requested.

2. Rejection of Claim 3 Under 35 USC 103 over Fife

The Office Action rejected Claim 3 under 35 USC 103 over Fife. The rejection should be withdrawn in view of the remarks below.

Applicants' invention as encompassed by Claim 3 relates to an anode comprising (a) a niobium metal core, (b) a conducting niobium suboxide layer, and (c) a dielectric barrier layer comprising niobium pentoxide, in which the suboxide layer has a thickness that is at least about 50 nm.

One of ordinary skill in the art following the teachings of Fife would not have been motivated to modify Fife, make or practice Applicants' invention.

Fife's method to at least partially reduce a metal oxide selected from a valve metal oxide would not have motivated one of ordinary skill in the art following Fife to modify this method and make an anode comprising (a) a niobium metal core, (b) a conducting niobium suboxide layer, and (c) a dielectric barrier layer comprising niobium pentoxide, in which the suboxide layer has a thickness that is at least about 50 nm. Similarly, Fife's oxygen reduced valve metal oxides or its other teachings would not have motivated one of ordinary skill in the art following Fife to modify Fife and make Applicants' invention.

Importantly, Fife does not teach an anode comprising a niobium metal core as encompassed by Claim 3. Fife does not teach the presence of a **suboxide layer** of a certain thickness. Anodes according to Fife comprise a niobium suboxide core which is not a layer as defined in Applicant's claims. In other words, Fife lacks the teachings required by 35 USC 103 to suggest Applicants' invention. Reconsideration is requested.

3. Rejection of Claims 6 and 7 Under 35 USC 103 over U.S. Pat. No. 6,215,652.

The Office Action rejected Claims 6, and 7 under 35 USC 103 over U.S. Pat. No. 6,215,652 (Yoshida).

Applicants' invention, as encompassed by Claims 6, and 7 relates to a process for producing an anode for a capacitor comprising sintering niobium metal powders and electrolytically producing a dielectric barrier layer on a surface of a

sintered body, in which the barrier layer is produced with an electrolyte that contains an aqueous solution of an organic acid containing an anion, and the the electrolyte has a conductivity ranging from about 0.15 to about 25 mS/cm or at least about 5 mS/cm.

Yoshida teaches a solid electrolytic capacitor in which a dielectric layer formed on the surface of an anode obtained by molding and then sintering a niobium metal powder comprises a niobium oxide layer and a niobium nitride region (See Summary of Invention). Yoshida also teaches a method for manufacturing a solid electrolytic capacitor by molding and sintering a niobium metal powder to form an anode, and then subjecting the surface of this anode to a nitriding treatment, and a step of anodizing the thus nitrided anode to form a dielectric layer comprising a niobium oxide layer and a niobium nitride region.

Claims 6 and 7 incorporate the limitations of Claim 4. The electrolytes encompassed by Claim 4 (and Claim 5) are not taught by Yoshida contain any conductivity values in relation thereto. Yoshida does not teach a process for producing an anode for a capacitor by sintering niobium metal powders and electrolytically producing a dielectric barrier layer on a surface of a sintered body, in which the barrier layer is produced with an electrolyte that contains an aqueous solution of an organic acid containing an anion, and the the electrolyte has a conductivity ranging from about 0.15 to about 25 mS/cm or at least about 5 mS/cm. Yoshida simply lacks the teachings that would have motivated one of ordinary skill in the art following Yoshida to modify Yoshida and make Applicants' invention. Reconsideration is requested.

In view of the foregoing amendments and remarks, allowance of Claims 1-8 is earnestly requested.

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NIOBIUM-BASED CAPACITOR ANODE

ABSTRACT OF THE DISCLOSURE

An anode is described that has a niobium-based barrier layer, which includes a niobium metal core, a conducting niobium suboxide layer and a dielectric barrier layer of niobium pentoxide.

This Information Disclosure Statement should not be construed as a representation that a search has been made, that additional information material to the examination of this application does not exist, that any reference mentioned herein constitutes prior art, or that the references listed, severally or in any combination with one another or with any other information, are believed to render any claim in the subject application prima facie unpatentable.

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